

Tulsa Tornado Tribune



Where People Who Know the Weather Get Their Weather

National Weather Service Tulsa, Oklahoma

Fall/Winter 2010-2011

Craig Sullivan - Editor

TROPICAL STORM HERMINE

The remnants of Tropical Storm Hermine brought very heavy rain and widespread flash floods to parts of the area September 7-9.

3 Day Storm-Total Amounts

Location	Amount
Whitefield, OK	13.42
Stigler, OK	11.25
Sallisaw, OK	10.41
5 ENE Eufaula, OK	10.35
2 NE Mountainburg, AR	9.81
R.S. Kerr Reservoir, OK	9.60
Natural Dam, AR	9.00
1 W Short, OK	8.40
1 S Scipio, OK	7.69
Webbers Falls, OK	7.40



Photo courtesy of Sequoyah County Times

Flooding in Sequoyah County, OK after Tropical Storm Hermine.

Tropical Storm Hermine made landfall along the coast of northeast Mexico on September 6, and proceeded north across central Texas. The system produced widespread flooding and several tornadoes as it lifted north and weakened.

Bands of rain associated with Hermine began to spread into southeast Oklahoma and northwest Arkansas on the 7th, before more widespread rain occurred on the 8th and 9th. The remnant low center moved from southwest Oklahoma into northeast Oklahoma, with the heaviest rainfall totals occurring east of the storm track.

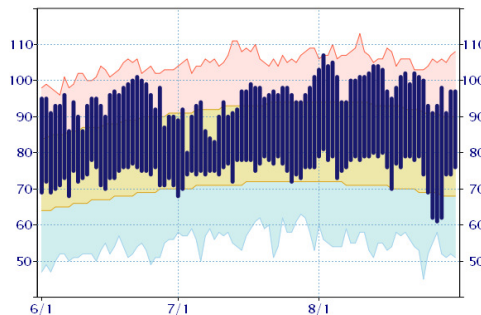
The initial wave of rainfall on the 7th brought from one-half to nearly 2 inches, with localized higher amounts of 3 to 5 inches, southeast of a Checotah, OK to Berryville, AR line. The

Hermine Continues on page 6

Long, Hot Summer

Here is a news flash: Summer, 2010 was hot! The heat arrived early, stayed late, and was generally unrelenting for several weeks. Statistically speaking, 2010 ranked right up there with some of the all-time worst we have seen. Fort Smith recorded the third hottest summer on record, in terms of daily average temperature from June 1 to August 31, just edging out 1954 and falling short of 1934 and 1936...and as any weather historian will tell you, that is some elite company! Tulsa fell just short of the top five, but still saw its hottest overall summer since the infamous summer of 1980.

Fort Smith, AR Temperatures
Jun 1, 2010 - Aug 31, 2010



The vertical blue bars represent the high and low temperature each day. The yellow shaded area represents the normal daily range. Only a handful of days saw below normal low temperatures.



ALSO IN THIS ISSUE:

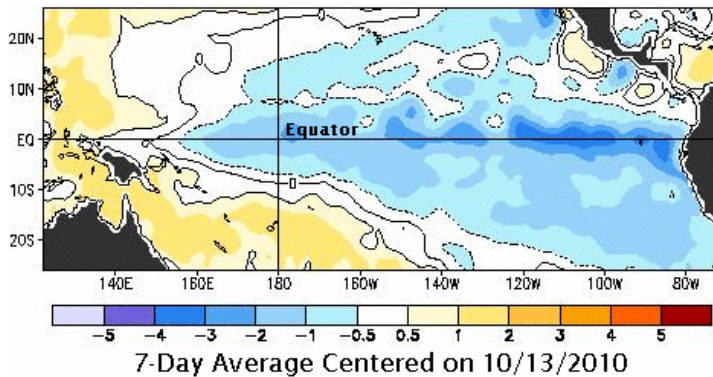
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While afternoon temperatures were above normal much of the summer, and heat index values exceeded 115 degrees on a few days, overnight low temperatures were more of a culprit this year. Both Tulsa, OK and Fort Smith, AR ranked second all-time

Summer Continues on page 6

La Niña and the Coming Winter

Observed Sea Surface Temperature Anomalies (°C)



Observations of ocean temperatures continued to show a strengthening cold episode, or La Niña, through the summer and fall. Negative sea surface temperature (SST) anomalies reached at least -1°C across most of the equatorial Pacific Ocean by the end of August. Consistent with this evolution, convection was enhanced over Indonesia, while remaining suppressed over the western and central equatorial Pacific. The pattern was associated with the continuation of enhanced low-level easterly trade winds and anomalous upper-level westerly winds over the western and central equatorial Pacific. Collectively, these oceanic and atmospheric anomalies reflect the strengthening of La Niña.

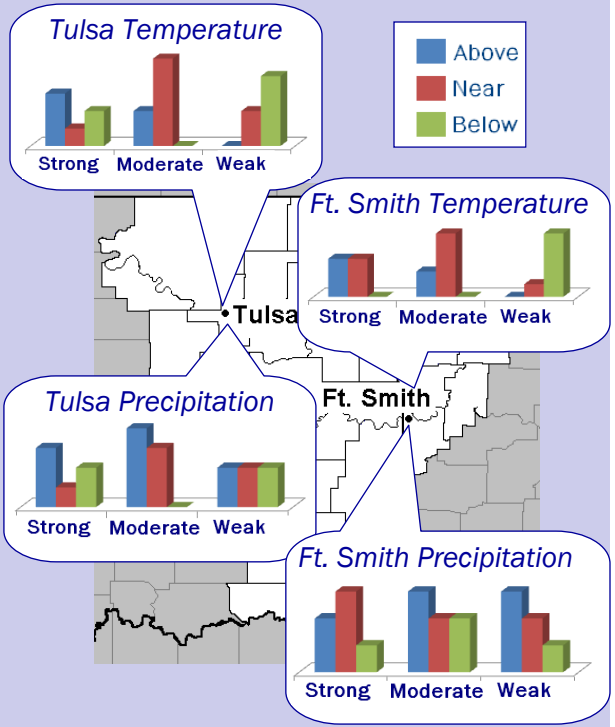
Nearly all models predict La Niña to continue at least through early 2011. However, the models continue to disagree on the eventual strength of La Niña. Based on current observations and model guidance, the SST anomalies should either persist near the present strength, or strengthen into the winter as is consistent with the historical evolution of La Niña. Thus, it is likely that the peak strength of this event will be at least moderate, and may even become strong.

Much like its counterpart, El Niño, this cooling of sea surface temperatures can influence weather around the globe, including that of the United States. Impacts from La Niña include the tendency for a warmer and drier cool season in the southern United States, along with cooler and wetter conditions in the Midwest and Pacific Northwest. Keep in mind, a warmer and drier winter does not necessarily translate into a season free of ice and snow. Significant individual ice and snow events can still occur within longer dry periods. For example, severe ice storms struck Oklahoma during the La Niña winters of December 2000 and 2007.

Closer to Home

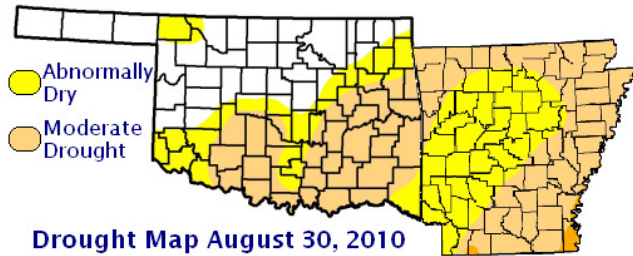
Locally, winter seasons during moderate to strong La Niña events show a tendency toward either near or above normal temperatures for the season as a whole, but not much signal for precipitation. If we examine all La Niña winters since 1950 (17 in all), and break them down by the strongest, weakest and middle third of events based on the Oceanic Niña Index, we can see how past events have shaped the winter season at both Tulsa and Fort Smith. Keep in mind that this is a very small sample size and thus the data should be used with caution. In any case, a few interesting trends do show up.

One interesting trend with weak La Niña events is the strong tendency for below normal winter temperatures at both Tulsa and Fort Smith...in contrast to moderate and strong events. A recent example was the winter of 2000-2001, which saw a long stretch of below normal temperatures for much of December, while January and February were actually a little warmer than normal.



“Flash” Drought

A lack of rainfall during August 2010, along with hot temperatures, led to a “flash drought,” with abnormally dry to moderate drought conditions across a large portion of eastern Oklahoma and northwest Arkansas by the end of the month.



Using the radar-derived estimated observed precipitation from the River Forecast Centers, rainfall totals for August 2010 ranged from around 7 inches over western Osage and Pawnee counties, to less than a tenth of an inch in parts of northwest Arkansas. Most of the region along and southeast of I-44 suffered from a lack of rainfall this August, with the hardest hit area stretching from near McAlester, through Gore, to Eureka Springs, where most places received less than 25 percent of normal August rainfall. In fact, a large portion of Washington County, AR

received less than five percent of normal August rainfall, and the observation site at Fayetteville Drake Field Airport (FYV) only recorded 0.02” of rain for the entire month!

The 90 day totals were not quite as bleak, thanks to some rain in the early part of summer. Nonetheless, a sizeable portion of the area southeast of I-44 received only 50 to 75 percent of normal summer rainfall. The climate district of southeast Oklahoma experienced its 18th driest summer on record, and the 10th driest warm growing season (March 1 through August 31). September rainfall, mainly from tropical storm Hermine provided relief to much of the area...however as of early November, much of northeast Oklahoma was classified as abnormally dry, as were parts of LeFlore, Latimer, Pushmataha and Sebastian counties. Moderate drought conditions had even begun to creep into portions of Okfuskee and Creek counties.

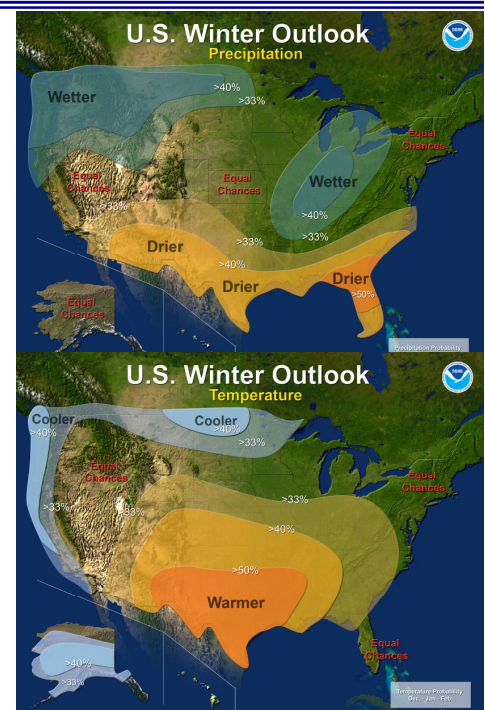
Based on the official winter 2010-2011 outlook from the Climate Prediction Center, drought conditions are forecast to develop over most of eastern Oklahoma and northwest and west central Arkansas through January of 2011.

Winter Outlook

The most recent long range outlook issued by the Climate Prediction Center strongly reflects the typical patterns associated with a La Niña event. Most notable for our area is the strong signal for a milder and drier winter across much of the southern states...which is reflected in the official outlook. This is not necessarily the best news for areas that are currently experiencing drought conditions, and may also point to a more active wildfire season through the early spring.

For eastern Oklahoma and northwest Arkansas, there is a 40%-50% chance of above normal temperatures, a 33% chance for near normal temperatures, and a 17%-27% chance for below normal temperatures for December 2010 through February 2011.

For eastern Oklahoma and northwest Arkansas during the same period, there is a 33% chance of above normal precipitation, a 33% chance for near normal precipitation, and a 33% chance for below normal precipitation.



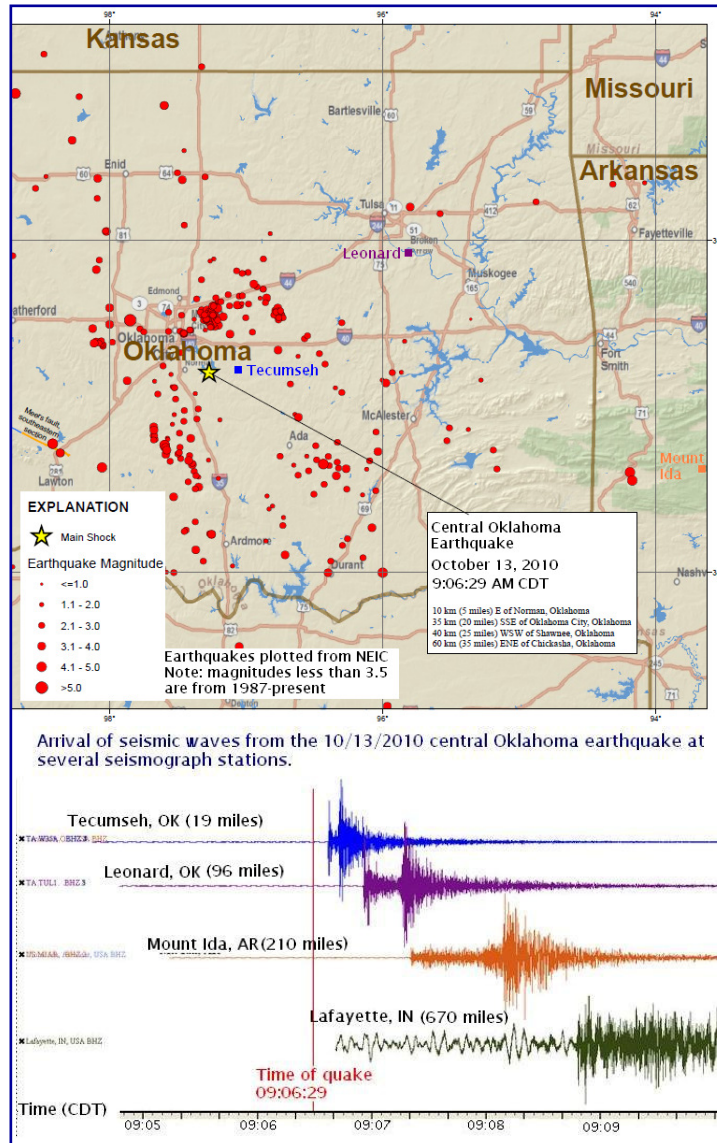
October 13 Central Oklahoma Earthquake

One of Oklahoma's strongest recorded earthquakes livened up an otherwise quiet day at the National Weather Service office in Tulsa on October 13. Most of us who were working here felt the quake, along with the majority of eastern Oklahoma and northwest Arkansas. Almost immediately, we received a number of calls from people asking if it was indeed an earthquake. While earthquakes are not weather related at all, The NWS does play a role in the information flow after an event. The National Weather Service in Tulsa issues an Earthquake Report whenever an earthquake of intensity IV on the Mercalli scale...basically enough to be felt by most people...or more is reported in the Tulsa forecast area. This is done to augment the flow of information concerning earthquakes in the area to the USGS National Earthquake Information Center.

The quake was centered east of Norman, OK and felt in several surrounding states. The current rating of 4.7 on the Richter Scale is still subject to further investigation. Nonetheless, it was a significant one...the second highest recorded in fact...in a state that is not exactly noted for being earthquake prone.

However, the October 13 earthquake is not unprecedented in central Oklahoma. The area has had earthquakes at least since it was settled, most of them small. Since 1974, more than 200 earthquakes have been detected within about 50 miles of this earthquake. In recent years, earthquakes roughly the size of this one oc-

curred in 1995 and on February 27, 2009. Earthquakes large enough to cause damage are rare. Since 1882, all of Oklahoma has had 11 damaging earthquakes. The largest of these, measuring 5.5 on the Richter Scale, caused moderate damage in and near El Reno on April 9, 1952.



The earliest historical account of an earthquake in Arkansas occurred in October 1882. Since few reports were received from the region most affected, the epicenter of this shock is not well known, and several investigators have placed the origin near El Reno, Oklahoma, instead of western Arkansas. The shock threw bricks from chimneys as far away as Sherman, Texas, and shook houses strongly at Fort Smith.

Earthquakes east of the Rocky Mountains, although less frequent than in the West, are typically felt over a much broader region. East of the Rockies, an earthquake can be felt over an area as much as ten times larger than a simi-

lar magnitude earthquake on the west coast. A magnitude 4.0 eastern U.S. earthquake typically can be felt at many places as far as 60 miles from where it occurred, even though it rarely causes damage near its source. A magnitude 5.5 eastern U.S. earthquake usually can be felt as far as 300 miles from where it occurred, and sometimes causes damage as far away as 25 miles.

Are You Firewise?

As of the time of this publication, much of the area was experiencing abnormally dry or even moderate drought conditions. With a forecast of enhanced likelihood of milder and drier conditions for the upcoming winter, we would like to focus some attention on wildfires. Every winter, as the temperatures turn colder, our lush green vegetation becomes dormant and turns a crisp brown. Dormant fine fuels, such as grass, do not take up moisture from the ground and dry up very quickly, even after a significant rain or snow.

People who live in the Wildland Urban Interface, or WUI, face special wildfire risks. Many of the subdivisions and small communities surrounding our urban centers are considered WUI areas. Simply put, a WUI can be found anywhere the more manicured, controlled urban environment meets the countryside. In these areas, fires that start in the grass, brush and trees can quickly move into the fringes of the developed areas and burn down homes. The April 9, 2009 fires near Midwest City, Oklahoma illustrated this point as a large grass fire quickly consumed a number of homes on the outskirts of the city.

There are several things to keep in mind through the winter months, as any warm, dry and windy period from now

until spring green-up takes place can lead to very high fire danger. It is very important to consider how safe your landscape is in the event of wildfire, especially those who live in a WUI or in rural areas.

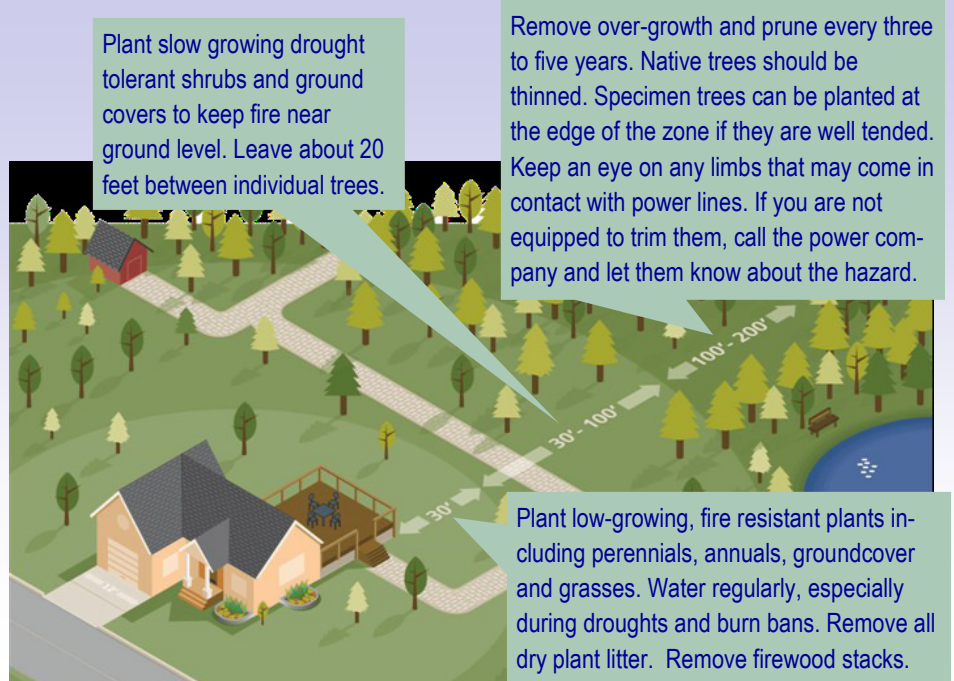
Remember to remove dead limbs and other debris from the ground. Also, check your roof and gutters for debris, especially leaves and twigs that fall at the end of the growing season. Remove limbs that extend over your roof or those directly above or within 15 lateral feet of a chimney.

Visit firewise.org for more information

Properly space trees when you plant. If you live in a rural area, carefully space your trees when planting. If a wildfire approaches, this practice helps to avoid a crown fire. Keep trees pruned up 6 to 10 feet from the ground to avoid "ladder fuels"—vegetation that links grass to tree-tops. You may also want to give your home a firebreak, such as driveways, gravel walkways, sidewalks and paths. Another good firebreak is to maintain a green grassy strip with cool season grasses, many of which will stay green through a typical Oklahoma and Arkansas winter. If you choose to do this, always remember to irrigate landscaping during dry spells.

What You Can Do

Most wildfires begin as small, creeping flames, not torching crown fires. Homes are usually ignited because of some flammable object or material in a home's defensible space, or the area directly surrounding a structure. It is best to maintain a minimum distance of 100-150 feet of defensible space around your house. Greater distances are recommended for homes on steep slopes or windswept exposures. There are three zones of defense recommended within this space. Carefully managed landscape vegetation in these zones creates breaks in the fire path and slows down advancing flames.



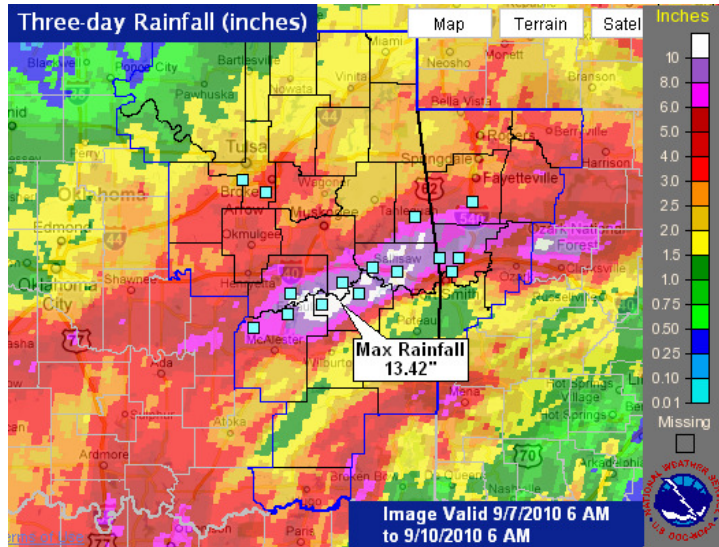
Hermine

(Continued from page 1)

NWS cooperative observer 5 miles northwest of Kingston, AR reported a 24-hour rainfall total of 3.99" ending at 7am CDT September 8.

Light rain fell across much of the area during the day on the 8th, before the rainfall intensity increased later that night and through the morning of the 9th. The heaviest rain became displaced from the storm's center, targeting east central Oklahoma and northwest Arkansas. Rainfall rates of over 2 inches per hour and rainfall totals of 8 to 14 inches, mainly north of a McAlester to Fort Smith line, and south of a Tulsa to Fayetteville line, led to widespread flash flooding.

Many small creeks and streams rose very quickly from this rainfall. Frog Bayou in Crawford County, AR crested at 16.99 feet at the Rudy gage site by the afternoon of the 9th, topping the Highway 282 bridge. The water rose almost sixteen feet in only 6 hours (7am - 1pm) at this site. Businesses and residences in Sallisaw, OK were inundated by high water, forcing schools to close. Emergency officials performed numerous swift water rescues and many roads were closed due to the high water throughout the area. Unfortunately, a 19-yr old male drowned on the morning of the 9th as he tried to



drive through high water over a low water crossing 7 miles south of Stilwell, OK in Adair County. Several small bridges and low water crossings were washed out, especially in Muskogee and Sequoyah Counties.



Barbed wire and large tree debris after flash flooding at a low water crossing in Muskogee County.

Photo by Ed Calianese, NWS Tulsa

Mainstem river flooding was minimized since much of the rainfall and runoff was contained by Eufaula Lake and Robert S. Kerr Reservoir. However, high lake levels at Kerr Reservoir resulted in high outflow downstream, which resulted in brief minor flooding along the Arkansas River at Van Buren. 🌧️

Summer

(Continued from page 1)

for average daily low temperature for the June through August period... Tulsa ranking only behind 1980 and Fort Smith ranking second only to 1934 (elite company again). Both locations also had the most consecutive days with minimum temperatures at or above 72°F.

For more information about the unusually warm overnight temperatures:

http://www.srh.noaa.gov/tsa/?n=weather-event_hotsummer2010

As is often the case during the summer, high pressure aloft dominated the Southern Plains and Southeast U.S., though it did seem to set in earlier and stay longer than usual. Wet weather during the early part of the summer helped contribute to higher humidity levels through much of the season. The higher humidity levels, along with persistent south winds, kept temperatures from cooling much during the overnight hours, allowing for many consecutive days with minimum temperatures at or above 70°F. There were only a few afternoon record high temperatures set this summer, but numerous record warm minimum temperatures fell (5 at Tulsa, 3 at Fort Smith, 7 at Fayetteville and 8 at McAlester). The low of 85 degrees at Tulsa International Airport on August 3 only fell to 85 degrees...the third warmest low temperature ever recorded (tied with several other occurrences), and only two degrees shy of the all-time record of 87 degrees on July 16, 1980 (THAT year again)!

The streak of hot summer nights finally broke in late August with the arrival of the first significant cold front, leading oddly enough, to a record low of 54 degrees at McAlester on August 27. 🌧️